THE

# Malayan Agricultural Journal.

OCTOBER, 1940

## EDITORIAL.

**Improving Quality of Padi.**

Padi, in common with many other plants that have been cultivated continuously for long periods, has given rise to a large number of varieties. The cultivator generally chooses for his main crop a variety that is specially suited to the locality concerned. This is satisfactory in areas where padi is grown solely to provide the needs of the cultivator and his neighbours who husk the padi in only sufficient quantity to provide rice for each day's requirements. The position is totally different when the crop is grown in greater quantity for the purpose of producing a surplus for sale to millers for bulk preparation of rice for a competitive market. The requirement then is for a uniform grain of a type of padi which finds favour in the market concerned, whether it be in the country of production or for export.

The Department of Agriculture has been concerned for more than a quarter of a century with investigations into the worth of the very many varieties to be found in Malaya and with the isolation of strains capable of giving a higher yield than the varieties grown.

Experience has shown that where padi is not a commercial crop, capacity for high yield alone is not a sufficient quality to make for popularity of a strain; the cultivator looks askance at any variety which differs materially from those he has been accustomed to grow, whether the difference be in appearance or in flavour. For such areas increasing attention is being given to the isolation of high-yielding strains from the most promising of the varieties commonly grown in the locality concerned. Where padi is grown on a commercial scale there is not quite the same prejudice to innovation and it is only natural that greater weight should be attached to the capacity for high yield. A further obvious requirement for such areas is that a strain selected for general planting should not only possess suitable milling properties, but that it should be capable also of succeeding when planted under as great a variation of conditions as possible, so that it can be grown over a wide area.

The article in this number "Pure Strains of Padi in Krian" recounts the success which has been achieved with the strain Seraup Kechil 48. This strain, with many others, was selected many years ago at the Titi Serong Padi Experiment Station and years of experiment were required, both at the Station and in the field in co-operation with the cultivators themselves, before it was felt that this strain could be recommended confidently for general use through the greater part of the Krian irrigation area. That our confidence was not misplaced is shown by the fact that some 70 per cent. of the crop sold to the Government mills from the 50,000 acres cultivated with padi in Krian now consists of this strain. For several years past the mills have paid a bonus for the strain, a practice which was followed by such commercial mills in Province Wellesley as competed for the purchase of the Krian crop before restriction was recently placed on the export of padi from the Federated Malay States.

**Recent Developments in the Malayan Pineapple Canning Industry.** The developments in the cultivation and canning of pineapples have been considerable during the past decade. Whereas formerly the fruit was grown as a catchcrop with rubber, at the present time two-thirds of the area under pineapple is planted as a sole crop. The conditions under which the fruit is canned have been much improved in many directions, and several factories have been entirely rebuilt and re-equipped. Rigorous attention is paid to cleanliness and legal authority given to close down any factory in which the strict hygienic conditions of packing are not maintained.

The pioneers of the Malayan pineapple canning industry were fortunate in that they were able to place on the world market a tropical delicacy at a very moderate price. Markets were easily established and held, for the competition of canned pineapples and other fruits was not strong. In recent years, however, the market conditions have become more difficult and exacting, canned pineapples are now produced in several countries, and there is also a very much wider range of canned fruits on the market, due in large measure to the growth of the fruit-canning industry in the United Kingdom. It must also be remembered that the marketing of fresh fruit with the aid of cool storage has made considerable headway in recent years. The housewife is only prepared to outlay a certain sum of money on the purchase of fruit, and the wider variety of fresh and canned fruits which are available in and out of season has had its repercussions on the canned pineapple industry.

These various problems have been met in Malaya by a reorganization of the industry and by previous systematic and thorough research work into all branches. Innovations are perhaps slow to be accepted by those who have found the way easy in the past, but whatever may be said of the hesitations in the past there is no doubt that the present re-organization, supported by legal authority, has given the pineapple industry a new—and it is to be hoped—a long lease of life.

The value of closer co-operation between those interested in various aspects of the industry is already evident. The present market situation created by the war has confronted the industry with new problems of control and marketing. While losses consequent upon loss or curtailment of our markets are inevitable, it is certain that the present organization is in a better position to cope with these difficulties than was the industry before the creation of the Central Board of Pineapple Packers and the Growers' Association, and we can feel a degree of confidence that their combined efforts will bring the industry through the difficulties created by the war with increased prestige to themselves.

The Canning Officer, in an article included in this issue of the Journal, records the progress made in reorganization of the industry and in the research work for which he is responsible. It will be seen that his investigations are concerned with very practical problems, and we are glad to note that those engaged in the industry look to him for advice and assistance, which, as his investigations progress, he is able to give in ever greater measure.

# Original Articles.

## PURE STRAINS OF PADI IN KRIAN

BY
E. J. H. BERWICK,
*Agricultural Officer, Krian.*

### Introduction.

The District of Krian is situated in the north-west corner of Perak and is some 330 square miles in area; here in 1906 was opened an irrigation scheme to provide water to 51,000 acres of padi fields and this was for many years the only large scale scheme in Malaya. A plan of this area is given in Figure 1 and it will be seen that the scheme included the damming of the Kurau and Merah rivers to form a reservoir approximately 10 square miles in extent. The water is led to the fields by means of a main canal some 20 miles long with numerous secondary distributaries, and from the fields it is drained through many natural or artificial channels into the sea or into the Kurau river.

The fields themselves fall naturally into two main areas, each of which has its own characteristics. The area in the north-west, comprising the mukims* of Bagan Tiang, Tanjong Piandang, Parit Buntar and Kuala Kurau, has a deep alluvial soil on which very heavy crops of padi, often up to 600 or even 800 gantangs† per acre, can be grown. In the south-east the mukims of Selinsing and Semanggol and much of Bagan Serai and Briah are on harder soils on which crops of over 300 gantangs are rarely maintained. In addition to these two main types there are also patches of peat chiefly in Bagan Serai and Briah on which yields are generally low.

The annual yield of padi from the whole area is about 600,000 piculs¶ of which just over half is used to feed the local inhabitants and the labour which migrates into Krian for the harvest, most of the surplus being sold to the Government Rice Mills at Bagan Serai and Parit Buntar. These mills, the first of which was opened at Bagan Serai in 1920, are run by the Government to control the price of padi in Krian so that the planter may receive a reasonable return for his work each year.

### The Quality of Rice in Krian.

It is often said that imported rice is always better than locally-grown rice and one of the main reasons for this is that in Malaya the padi fields are comparatively small in size and contain many different varieties of padi. Figures 2 and 3 are photographs taken for instructional purposes to show the effect of mixed strains on quality of rice; in Figure 2 the sample on the left contains

* *Mukim* M. = a parish.

† *Gantang* M. = Imperial gallon weighing between 5½ and 6 lbs. of padi.

¶ *Picul* M. = 133⅓ lbs.

# FIGURE 1
# IRRIGATION MAP OF THE KRIAN DISTRICT

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several different varieties of padi and some of the grains are not fully ripe, while the sample on the right is of a pure strain of padi and the grain is all of the same size, shape and degree of ripeness. Figure 3 shows the rice made from these samples; in the sample on the left made from the mixed padi there is much broken grain, the whole grain is of different sizes and some of the padi has even passed through unmilled; in the rice from the unmixed padi, however, there is little broken rice and the grain is all similar and polished to the same degree and, in fact, the sample compares favourably with most imported rice. To obtain good rice, therefore, it is necessary for the mills to mill only one type of padi at a time and to keep all the different types of padi separate. It is uneconomic to do this unless large quantities of each type are available and it is considered that not less than 50,000 piculs of any one type of grain is of any real use if the quality of the rice produced is to be maintained from year to year. As the mills receive only some 200,000 to 300,000 piculs in a normal season, there is at most room for four types of padi in Krian and a smaller number would be preferable.

At Titi Serong Padi Station in Krian work on the selection of high-yielding strains of padi has been in progress since 1916, and in 1932, when the charge of the Station was transferred from the Botanist Division to the Field Branch, the collection contained many strains which had been proved capable of producing high yields. Whilst selection of new strains has been continued, one of the main tasks of the Agricultural Officer who was appointed to Krian in 1932 was to determine which, if any, of the strains on the Station would be the most suitable for general distribution. To facilitate this it was decided to open in each mukim a small Station for testing the suitablity of strains to the locality.

By the end of 1932 three Stations had been opened in the mukims of Kuala Kurau, Briah and Selinsing respectively. In 1934 another was started in Bagan Serai and in 1935 a temporary one was leased in Semanggol. The mukims of Bagan Tiang and Tanjong Piandang are fairly well catered for by the Station at Titi Serong but in 1938 a Station was opened in an extension area at Tanjong Piandang.

The most promising varieties of which pure strains were available appeared to be Seraups, 8 months padis, Radins, 7 months padis, both of which had been selected at the Titi Serong Padi Experiment Station between 1916 and 1932, and Siams, $6\frac{1}{2}$ to 7 months padis which had been selected at Pulau Gadong in Malacca in 1929. Tests were therefore made with eleven strains of Seraup, nine of Radin and two of Siam. The results of controlled experiments at the various Test Stations have been given in previous numbers of this Journal ([2, 3, & 4,]) and by 1935 it had been shown that Seraup Kechil 48 (known as S.K. 48) was the most promising strain for Krian North and Siam 29 (known as Sm. 29) appeared to be suitable for Krian South. In addition to these experiments, numerous milling tests, ([5]) which clearly showed the superiority of pure strains over a mixture of varieties, and observations had been made. The strain S.K. 48, in addition to yielding well, was shown to be a fair miller and Sm. 29 milled remarkably well but had the disadvantage of weak straw.

**Field Trials.**

Before commencing distribution on a large scale of either of these strains it was considered desirable to carry out further field tests in co-operation with cultivators. Ketuas* and selected planters were asked to test the strains in their own padi-fields against the varieties they commonly grew.

In the 1935/36 season twelve planters in Krian North were asked to try the S.K. 48 and twenty-four in Krian South the Sm. 29. In all cases the cultivators planted their own padi (which, in Krian North especially, were in many cases strains which had been obtained from the Department of Agriculture in previous years) next to the strain under trial and at harvest cutting tests were made of both. In addition all were invited to comment and criticise the strains. In Table I some typical examples of the results obtained in the trials with Sm. 29 in Krian South are shown.

In the trials in Krian North, Seraup Kechil 48 beat the kampong† padi in nine out of the twelve trials, giving an average of 471 as against 423 gantangs per acre, an increase of 11 per cent. Actually as S.K. 48 is a very heavy padi the result on a weight basis was even better than this and it must be remembered that the Government Rice Mills buy on weight and not on volume. The cultivators commented favourably on the strength of the straw, and the quality and palatability of the rice, but two said that they were disappointed with the yield. It appeared to be, however, a fairly satisfactory strain for most of north-west Krian and it was decided to proceed with large-scale distribution until a better variety could be found.

In Krian South Sm. 29 gave an average yield of 272 gantangs per acre as compared with 259 for the kampong padi, an increase of only 6 per cent. December, 1935, and January, 1936, were two very wet months and the Sm. 29 lodged badly in many of the trials but as heavy rain is frequently experienced in the later months of the year and perfectly dry weather is not invariably experienced for harvest, it is obvious that the weak straw of this strain would be a decided disadvantage for Krian. A further factor of special importance in Krian was that rates for harvesting Siam were found to be higher than for other varieties; it is also a very light padi which is another disadvantage. It was decided, therefore, that Sm. 29 could never be grown on a commercial scale in Krian South although many cultivators said that they would like to grow a little each year for their own consumption.

The results also emphasized that as the result of the provision of increased irrigation facilities which allow of an earlier water supply to south Krian there is an increased tendency for long term varieties to replace the 6 or 7 months padis previously grown there and several of the cultivators asked for trials with S.K. 48 in this area. Trials similar to those of the previous year were organized in

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* *Ketua* M. = local headman.

† *Kampong* M. = a village.

*Kampong padi* M. = local unselected padi generally very mixed.

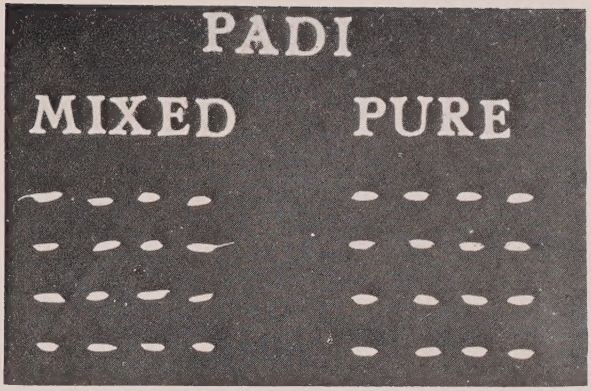


Figure 2. Mixed Padi (left) and Pure Strain Padi

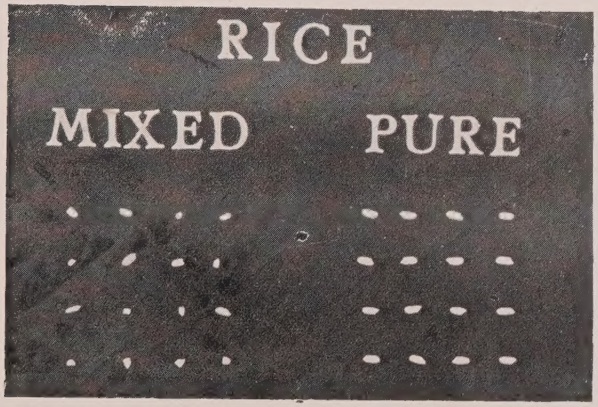


Figure 3. Rice made from Mixed Padi (left) and Pure Strain Padi (right).

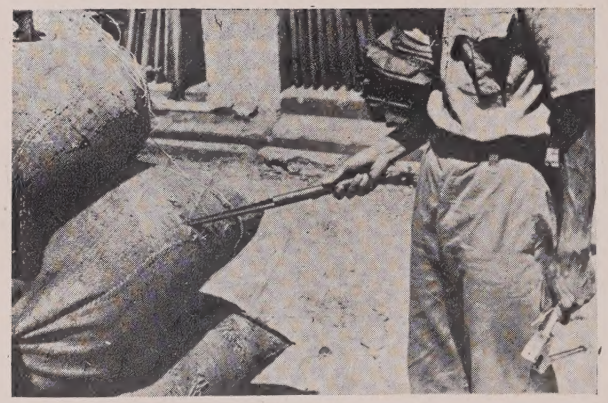

Figure 4. Sack of Padi being Sampled by an Inspecting Officer. The Clamp can be seen in his left hand.

Figure 5. Sacks Sealed with Lead Seals.

1936/37 with 29 cultivators; in these trials S.K. 48 gave an average yield of 268 gantangs per acre and the kampong padis 266 gantangs per acre. The S.K. 48, however, was much heavier than the kampong padis and there was a gratifying lack of unfavourable comment. It was therefore decided to recommend S.K. 48 for Krian South as well as Krian North until a more suitable strain be found.

### The Spread of Seraup Kechil 48 in Krian.

For the harvest of 1936 the Government Rice Mills decided to help the spread of approved pure strains in Krian by giving a bonus of ½ cent per gantang (approximately 6 per cent. increase) on all padi which was certified as pure S.K. 48 or Siam 29 by the Department of Agriculture and during the harvest that year some 20,000 piculs of Seraup Kechil 48 and Siam 29 received such a bonus. In the following year the bonus was changed to 10 cents per picul (approximately 5 per cent. increase) and confined to S.K. 48, and many cultivators in both Krian North and Krian South decided to grow this strain for the sake of the bonus. They obtained seed from their nearest Test Station, either buying it at local prices or exchanging it for their own seed. At harvest a certificate was obtained from the officer from whom the seed had been obtained, stating that the crop was S.K. 48 and the padi was taken to the Rice Mill where the certificate was surrendered and the bonus received. This certificate system was, however, open to abuse, and in 1938 a system of sealing each sack was introduced. Each individual sack was sampled by an inspecting officer as shown in Figure 4 and if it attained the required standard it was sealed with a Government lead seal (see Figure 5). Sacks thus sealed received the bonus at the mills.

The growth in popularity of S.K. 48 is shown in Table II which gives the amount of padi receiving the bonus each year. It will be seen that in four seasons the quantity grown has increased from less than 3 per cent. of the total Krian crop to over 30 per cent. and that now about 70 per cent. of the rice produced in Krian is made from Seraup padi. It is also interesting to note that in 1938/39 the average weight of all sacks of S.K. 48 brought to the Government Rice Mills was 1.092 piculs, whereas the average weight per sack of other types of padi was 0.967 piculs, a difference of 9 per cent.

As all in Krian—grower, middleman and mill—now know and recognize Seraup Kechil 48, the system of sealing was suspended in 1940, the padi merely being inspected at the mill by an officer of the Department of Agriculture and if it came up to the required standard, it qualified for the bonus. The system of sealing is, however, very useful in the early stages of distribution of a strain and it is likely to be reintroduced when new strains are ready for distribution.

### The Selection of New Strains.

The second method of approaching the problem of finding the three or four strains required in Krian was to select a few varieties of padi from the innumerable types already being grown, in order to obtain new strains more suitable than those previously selected. Acting on the assumption that the suitability of a padi

to any area may be judged by the popularity of the padi in that area, surveys were made during the harvest of 1934/35 and 1935/36 to find the three most popular varieties of padi grown in each ketua area. All such areas in Krian, totalling 73, were examined and some typical results are given in Table III.

The results of these surveys were discussed by the Mukim Advisory Committees and it was decided that the strains most likely to give a good type of grain together with high yields were Seri Raja for the fields in Selinsing and Semanggol and Serendah for the low-lying rather peaty areas in Bagan Serai Selections of these varieties, both of which are long-term padis, were made in all areas and tested at the Experiment Station at Titi Serong with the result that there are now several strains, notably Seri Raja 31 and Serendah 61, which, although not yet ready for trials by ketuas appear to be promising. A re-selection of Seraup Kechil has also been made and it is hoped that there will shortly be a strain which is even better than S.K. 48.

**Summary.**

A brief description of the Krian Irrigation area is given; the 51,000 acres of fields produce some 600,000 piculs of which 200,000 to 300,000 piculs are surplus to the requirements of the local inhabitants. To maintain a satisfactory standard of rice not more than three or four types of padi must be bought by the Government Rice Mills in this area. The search for these strains is described. There were two lines of approach, firstly, the testing of already existing strains, both on Padi Stations and in the field, the distributing of the seed of one good strain, and the certifying by various methods that the padi was to the required standard; and secondly, the choosing of new varieties of padi from which new strains were selected. One already existing strain (Seraup Kechil 48) has shown itself to be fairly satisfactory and about 70 per cent. of the rice in Krian is now made from this padi. Some new strains show promise but they have not yet reached the stage of field trials.

**Acknowledgment.**

The information in this article has been compiled mainly from reports by my predecessors in Krian, Messrs. R. G. Heath and C. H. Burgess. Dr. H. W. Jack, M.B.E., now Director of Agriculture, Fiji, was responsible for Titi Serong Station from its inception in 1916 until it was taken over by the Field Branch in 1932. Much valuable advice in the early stages of the work was given by Mr. G. E. Coombs, then Economic Botanist.

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## Table I.

### Some Typical Examples of the Results obtained in the Trials with Siam 29 in Krian South.

| No. of Trial | Cultivator's Name | District | Yield in gantangs | | Name of Kampong Padi | COMMENTS | |
|---|---|---|---|---|---|---|---|
| | | | Sm. 29 | Kpg. Variety | | Favourable | Unfavourable |
| 1. | Saidin | Tebok Haji Dollah, Selinsing | 267 | 293 | Seri Raja | 1. Suited to high lands, good padi.<br>2. Wishes to repeat trial.<br>3. Very good rice.<br>4. Co-operative harvesting possible despite weak straw. | 1. Straw slightly weak on high land, very weak in deep spots.<br>2. Maturation period short, consequently much bird damage.<br>3. Would only grow 2 to 3 acres for own use. |
| 5. | Udin bin Imak | Parit No. 1, ... Selinsing | 237 | 222 | Karang Dobeh | 1. Wishes to repeat trial.<br>2. Yield satisfactory<br>3. Good for high lands only. | 1. Weak straw.<br>2. Would grow 2 acres only.<br>3. Not fully satisfied with strain. |
| 10. | Osman b. Ismail | Padang Lalang, ... Semanggol | 191 | 214 | Radin Company | 1. Rice good, slightly hard when cold.<br>2. Suits high lands 3 to 4 ins. water. | 1. Weak straw.<br>2. Must thresh quickly as straw rots rapidly when cut.<br>3. Too light a strain for sale.<br>4. 2 acres limit. |
| 13. | Mat Taib bin Abdullah | Kampong Dew, ... Selinsing | 296 | 238 | Serendah | 1. Rice good.<br>2. Fair tillers.<br>3. High lands 4 ins. water suitable. | 1. Lodged.<br>2. Ripens too early<br>3. Strain too "light".<br>4. Plant 1 to 1½ acres. |
| 18. | Hashim | Pt. Haji Ali, ... No. 2 Briah | 225 | 218 | Padi Hitam | | 1. Straw too weak for large scale unless family large for complete hand harvesting.<br>2. Too early and would get damaged by birds. |

## Table II.

### Pure Strains bought by the Government Rice Mills in Krian, 1936 to 1939.

| Harvest | Strains receiving Bonus | Quantity which received the Bonus | | |
|---|---|---|---|---|
| | | Piculs | Percentage of Total Padi bought by the Government Rice Mills | Percentage of Total Padi grown in Krian |
| 1936 | S.K. 48 & Sm. 29 ... | 20,000 | 8 | 3 |
| 1937 | S.K. 48 only ... | 88,000 | 37 | 12 |
| 1938 | -do- ... | 97,000 | 61 | 17 |
| 1939 | -do- ... | 199,000 | 69 | 32 |

## Table III.

### Some Examples of the Results obtained in the Survey of the Varieties in each Ketua Area.

| Mukim | Ketua | Area | Varieties Commonly Planted and Their Percentages. | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Parit Buntar | Abdul Rahman | Titi Serong, Tebok Haji Musa & Tg. Piandang Rd. | Seraup 90 per cent. | Radin 10 per cent. | |
| Kuala Kurau | Mansor | Pt. Tengah, New Coast Road. | Seraup 70 per cent. | Segenggam 20 per cent. | Radin 10 per cent. |
| Bagan Serai | Sa'at | Pt. H. Tahir | Serendah 40 per cent. | Seraup 25 per cent. | Radin 20 per cent. |
| Briah | Hussain | Pt. H. Taib No. 3 | Seraup 35 per cent. | Serendah 30 per cent. | Radin Che Ali 25 per cent. |
| Selinsing | Mohd. Isa | Samagagah | Seraup 35 per cent. | Seri Raja 25 per cent. | Radin Raj Said 20 per cent. |
| Semanggol | Saad | Sungei Kepar | Seri Raja 25 per cent. | | Radin Kuning 20 per cent. |

# RECENT REORGANIZATION AND RESEARCH IN THE MALAYAN PINEAPPLE CANNING INDUSTRY

BY

W. J. B. JOHNSON,

*Canning Officer, S.S. and F.M.S.*

The steady growth during the past 20 years of the Malayan pineapple canning industry to a position of major importance amongst the agricultural exports of this country has necessitated considerable developments both in the organization of the industry and in technical research.

In 1930 and 1931 a Conference, appointed by H. E. The Governor and High Commissioner, was held to investigate the conditions then existing in the industry, a report of which was published in August, 1931. Since that date numerous issues of this Journal and Annual Reports have recorded changes in the organization of the industry and the appointment of a Canning Officer with the subsequent opening of a Canning Research Station and Demonstration Factory in the State of Johore. The present article records the progress made in organization and research during the past two years.

## Organization.

THE CENTRAL BOARD OF PINEAPPLE PACKERS, MALAYA.

During 1937 and the early part of 1938 the industry passed through the worst slump in its history, the selling price of a case of 48—1½ lb. squat cans of Standard quality falling as low as $2.40. These depressed conditions were brought about by the competition, which has increased enormously during the past few years in the canned fruit trade, coupled with lack of organization and co-operation in the Malayan pineapple industry. On many occasions in the past both packers and growers have, in times of difficulty, attempted to organize themselves in order to safeguard their several interests; but such efforts always failed to achieve the results aimed at owing to lack of sustained support for any course of action agreed upon. Early in 1938 there were many discussions among the packers, who in May of that year petitioned Government to come to their assistance. The packers put forward proposals for consideration in which they frankly admitted that past experience indicated that some measure of control by Government and the enactment of legislation to effect this would be required to bring about effective organization and provide the stability and continuity of effort which they considered necessary to enable the depressed conditions to be remedied and to place the industry in a position to function successfully in the future.

The scheme put forward was considered to be generally satisfactory and likely to achieve the objects sought. After certain amendments and additions it was accepted by the three Malayan Administrations which are at present concerned with the canned pineapple industry, *viz.*, the Straits Settlements, Selangor and

Johore. The necessary legislation was enacted and the inaugural meeting of the Central Board of Pineapple Packers, Malaya, was held on 6th February, 1939.

The scheme provides *inter alia*:—

(a) Legal power to specify one or more Associations as being representative of the canning branch of the pineapple industry.

(b) That the Registrar under the Pineapple Industry Ordinance and Enactments may refuse to register a pineapple factory (1) if he is of the opinion that there already exists a sufficient number of pineapple factories to satisfy the requirements of the Malayan trade and/or (2) if the applicant for such registration is not a member of a representative Association as specified in (a) above.

(c) For the establishment of such a representative Association, designated The Central Board of Pineapple Packers, Malaya, and composed of pineapple canners, each member being allotted a number of shares, the number being determined proportionately to the output of the factory or factories owned or otherwise controlled by such member.

(d) That sales of canned pineapples by members shall be to the Central Board only, at a price to be fixed by that Association from time to time. The Association, however, has power to authorize sale by one member to another member.

(e) For Government representation at the meetings of the Central Board with very definite powers of control.

(f) For the attendance of representatives of the Singapore Chamber of Commerce and of the pineapple growers at all General Meetings of the Association.

(g) For the price to be paid by members for fresh fruits. This price is varied in accordance with a sliding scale and at any given time is fixed by calculation based, on the one side, upon an agreed basic minimum price for a case of canned pineapple (G.A.Q. 1½ lb. cubes) and an agreed rate of allowance for the fruit contents of such a case and, on the other side, upon the market price ruling at the time for a case of G.A.Q. 1½ lb. cubes.

(h) That the Association shall adopt within two years of the date of inauguration the Malayan Mark or any other scheme introduced by the Governments of Malaya concerned with the grading of pineapple products.

The sliding scale originally adopted for the price to be paid for fresh fruits proved very satisfactory for fruit of average size and quality, but it did not specify the prices to be paid for fruit of quality and size above or below the average, and it was found necessary to draft an additional schedule of rules for calculating the prices to be paid for all types of fruit. For the purpose of these calculations it was agreed that the fruit should be divided into four classes according to weight and two classes according to degree of ripeness, namely: "less than half ripe" and "at least half ripe," and the prices calculated on the basis of the figures given in the following table:

| Class of Fruit | Total Percentage Recovery | Average Weight of 100 Fruit lbs. | No. of Cans filled by 100 Fruit | Percentage of Golden Pack in Fruit "at least half ripe". |
|---|---|---|---|---|
| Under 1½ lb. ... | 17 | 125 | 28 | nil |
| 1½ lbs. to 2½ lbs. ... | 20 | 200 | 53 | 30 |
| 2½ lbs. to 3½ lbs. ... | 20 | 300 | 80 | 40 |
| Over 3½ lbs. ... | 20 | 400 | 107 | 60 |

The premium to be paid to growers for golden fruit, calculated on the figures given above, is one half the difference between the selling price of Golden and Standard grades of the canned article. It was also agreed that factories in Kranji, Singapore, should pay an additional 10 cents per fruit content of one case and those in the Municipal area of Singapore an additional 15 cents to cover further transport costs and export duty on fresh pines from Johore. By these rules the growers share very fairly with the canners any fluctuations in the market price of canned pineapple.

Since its inauguration the Central Board has operated smoothly and efficiently. The selling price of a case of canned pineapple was raised from $2.40 to $3.10 on the formation of the Board; this price was subsequently steadily raised to $3.35 per case before the outbreak of war. The price now stands at $4.85, the final increase being due almost entirely to the increased costs of the raw materials. The Board has made possible the control of production and marketing and has placed the industry in a more stable financial condition and in a more manageable state, at the same time safeguarding the interests of the growers.

### Growers' Association.

After the formation of the Central Board the growers felt the need of some representative body to safeguard their interests. After much discussion, the Singapore and Johore Pineapple Planters' Association was formed with an office in Johore Bahru, with the object of safeguarding the interests of the growers and of improving conditions for them. The Association was given official sanction and two Government representatives attend all meetings. The Association has already proved itself useful by keeping a watch on the prices paid for fresh fruit at factories, and during the recent strikes in the factories by allocating the reduced quota of fruit to the growers.

### Standardization of Can Sizes.

Regulations governing the use of the ten standard can sizes agreed to by the canners came into force in March, 1938, and apart from the initial troubles experienced by the canners during the change over from non-standard to standard

sizes the regulations have worked satisfactorily, and there have only been very few instances where cans have been found to vary from the dimensions specified by more than the tolerance allowed.

The ten sizes included in the regulations were made to conform in diameter to United Kingdom and American can sizes, while the heights were chosen to suit the canners' requirements, governed largely by the size of the sheets of tinplate available in Malaya. This partial standardization was carried through as it was considered to be the first step towards full standardization in which all sizes used in Malaya would be exactly similar to United Kingdom and American sizes.

The change over to full standardization in one move would not have been practicable; firstly as many of the canners were at first opposed to any form of standardization, and secondly as it would have upset the existing markets for many of the non-standard cans which at the time were considerable.

This partial standardization has proved a success; it has greatly simplified the packing and has helped to stabilize the market and standardize the pack. It is now generally approved by the industry and several of the large canners have expressed the opinion that they would now welcome a change over to full standardization, limiting the number of sizes to about five and all corresponding exactly to United Kingdom and American sizes, with the exception of the 1½ lb. Squat size, which is a can peculiar to this industry and for which there is no United Kingdom or American equivalent.

Malayan Mark Grading Scheme.

The regulations for the Malayan Mark Grading and Marking Scheme came into force about the middle of 1938; they were introduced as a voluntary scheme and up to date none of the canners have started to pack under the scheme.

Considerable work has been carried out at the Canning Research Station to draw up exact working definitions of the various factors of quality for marking and grading in order to standardize the examination of Malayan Mark samples and to eliminate the human element as much as possible. Numerous samples were examined on Malayan Mark lines in order to perfect the technique of examination. Samples are now being taken every month from all operating factories for examination on Malayan Mark lines and reports on the samples are submitted to the canners with a view to making them familiar with the working of the scheme.

## Research.

New Canning Research Station and Demonstration Factory.

During the latter half of 1937 the Canning Officer transferred his office and laboratory equipment from Kuala Lumpur to a temporary building in Johore Bahru, in order that he might be near at hand during the erection of the buildings for the new Canning Research Station at the 5th Mile Scudai Road, Johore Bahru. The buildings for the Station were completed before the end of 1937 and the office and laboratory were equipped and research work resumed, but owing to the inter-

national situation there was some delay in the delivery of the machinery for the Demonstration Factory, and it was not until early in 1939 that all the machinery was finally installed and the plant working.

The Station consists of two sections, one containing a laboratory and small-scale canning plant, where canned foods can be examined and tests made on the raw products of canning such as tinplate and sugar; also where research work can be carried out to improve processes and to investigate the causes of faulty packs. The other section consists of the demonstration factory in which an up to date full sized line of canning machines is installed, also some modern machines for can making. The objects of the demonstration canning plant were two-fold; firstly to ensure that the machinery, which the canners are recommended to install, could be worked satisfactorily under the conditions prevailing in this country, and secondly to demonstrate practically the benefits to be gained by the use of modern machinery. Both these objects have already been achieved successfully; the machinery has proved itself very suitable for use in this country, and many, if not all, of the canners are favourably impressed with the advantages of installing similar machines in their factories. One exhauster similar to the one installed at the Station has been ordered, and had it not been for the uncertainty caused by the international situation more orders would probably have materialized.

This excellently equipped Research Station supplies technical information and advice to canners free of charge, not only on matters connected with the canning of pineapples and pineapple products but with the canning of any local foodstuffs, and judging by the numerous enquiries and requests for information which have been answered, the establishment of the Station has already been largely justified.

RESEARCH WORK.

In addition to the examination of raw materials, finished products and waste products, and the laboratory study of problems submitted by correspondents, some 75 canning trials have been carried out at the Research Station with the object of collecting as much information as possible concerning the canning of pineapples and to help to improve the present method of processing.

*Canning Sarawak Pines.*

The variety of pineapple known locally as the Sarawak pine is very similar to the Smooth Cayenne variety which is canned in huge quantities in Hawaii and produces what is usually regarded as the best canned pineapple obtainable. In spite of the general belief of the local canners that the Sarawak pine could not be canned successfully it was felt that exhaustive canning trials should be carried out, and arrangements were made with the State Agricultural Officer, Johore, to plant some 4 acres of these pines at the Kota Tinggi Pineapple Experiment Station in Johore. These plants started to come into bearing towards the end of 1939. Preliminary trials soon indicated that Sarawak pines could be canned satisfactorily using much the same processes as used for Singapore pines, but unlike the Singapore

pineapple, which is unaffected by overcooking up to twice the normal cooking time, the Sarawak pine tends to disintegrate if seriously overcooked; possibly for this reason the local canners had condemned this variety as unsuitable for canning.

The average weight of all the fruits used in the canning trials was 4 lbs. 3 ozs., which is some 1¼ lbs. more than average Singapore pines. The fruit appeared to be in prime condition for canning when the two or three lowest whorls of fruitlets showed yellow colouration; it was more uniform in size and shape than the Singapore pine, and was comparatively free from disease.

The colour of ripe Sarawak pines when canned is an attractive straw yellow colour, which, although it cannot be compared with the golden yellow colour of ripe Singapore pines, closely resembles the colour of the Hawaiian canned pineapple. Unripe Sarawak fruit when canned is white, and over-ripe fruit tends to produce spots of brown discolouration and therefore cannot be used: it will be realized, therefore that there is no degree of ripeness in Sarawak pines which corresponds to the Standard grade for Singapore pines.

The flavour of Sarawak pines when canned is more pronounced than that of the Singapore variety, resembling more nearly the flavour of Hawaiian canned pineapple; it is sweeter but has not such an attractive acid tang as the Hawaiian fruit. The preference for Singapore or Sarawak canned pineapple is of course a matter of personal taste, but it is probable that the majority of people would prefer the Sarawak flavour. During a visit to the Canning Research Station by many of the canners and representatives of exporting firms a number of dishes of Singapore canned pineapple cubes were set out, among which one dish of Sarawak cubes was placed. No mention was made of what was in the dishes and those present were asked to taste and express their opinion as to the flavour. Almost without exception the visitors picked out the dish of Sarawak pines and commented on the excellence of the flavour.

Apart from the flavour there are two factors which favour the canning of Sarawak pines. Firstly the percentage recovery by weight of cut fruit is greater than for Singapore pines, as shown in the table on page 445, and, secondly, Sarawak fruit does not absorb so much sugar during processing. In order to get the prescribed final density after canning of 17° Brix, a sugar syrup of lower density is required for Sarawak than for Singapore pines. It is calculated that a saving of about 1,200 lbs. sugar would be effected in every 1,000 cases of 48—1½ lb. Squat cans.

These trials not only indicated that Sarawak pines could be canned successfully, but that this variety could be canned more cheaply than the Singapore Canning pine, producing a pack superior in flavour, but lacking the bright golden colour of the Singapore fruit.

*Canned Pineapple Juice.*

Considerable work has been carried out to investigate the processes for canning juice of both Singapore and Sarawak pineapples. The majority of the

experiments have been designed to produce a pineapple juice resembling as closely as possible the Hawaiian juice which is finding very large sales in the United States and elsewhere.

The colour and appearance of Singapore pine juice are excellent but the flavour even of the fresh juice is inclined to be insipid; the colour of Sarawak pineapple juice is paler but the flavour more pronounced. It has been found that the flavour of pineapple juice is very sensitive to heat treatment. Heating to temperatures above 175°F. or any heating at all in contact with the atmosphere causes deterioration of the flavour. Consequently the best results have so far been obtained by filling cans with cold fresh juice, closing at once, and pasteurizing the cans in tanks of hot water at 170°F. for half an hour. Many other and more complicated processes have been tried, but the simple method described above has so far proved the most successful. The flavour of canned Singapore pineapple juice when correctly processed is pleasant, although not very strong, whereas the local Sarawak pine juice has a more pronounced flavour. For this reason locally canned Sarawak juice should be more successful in finding a market than the juice from Singapore Canning pines. The flavour of the juice from Singapore pines may be greatly improved by the careful blending of juices from ripe and unripe fruit, the proportions depending upon the degree of ripeness of the fruit. It has been noticed that small fruits from plants during their fourth or fifth year tend to give a juice of superior flavour. It is apparent that the blending of juice for commercial production would require very careful supervision.

*The Exhaust Process.*

The exhaust process is employed in various forms in almost every type of canning process thoughout the world, its main object being to produce a vacuum in the cans after closing, either by heat treatment before the cans are closed or by actually closing the cans in a vacuum. The advantages of the exhaust on canned pineapples are two-fold; firstly a marked improvement in the degree and uniformity of colour of the fruit is produced, and secondly, the vacuum prevents excessive distortion of the can during processing and greatly reduces the possibility of "flippers" and "blown" cans. All the known forms of exhausting have been tried out with variations, and the conclusion has been reached that the normal hot water exhaust of 5 minutes at 205°F. is the most practicable and satisfactory for use in Malaya. Canning trials have been carried out to find out the extent of the colour improvement due to this process as compared with the non-exhaust method. A marked improvement in colour was recorded in all grades of fruit from pure white unripe fruit to fully ripe golden fruit. The improvement in colour is most marked about the middle of the scale, with fruit which would normally be classed as Standard quality. It is apparent that a large proportion of the fruit which is now packed as Standard grade would satisfy Golden grade colour standards if packed using this exhaust process.

*Closing Machines and their Relation to Type of Can Employed.*

When the exhaust process is employed the open cans, containing fruit and syrup, emerge from the exhauster at 180 to 200°F. and are then immediately closed whilst hot. With the semi-automatic double-seaming machines used at present in Malaya the cans are fed to and removed from the machine by hand and during the seaming process the cans revolve at high speed and a spray of syrup is thrown off. If these machines are used in conjunction with the exhaust process, the continuous handling of hot cans and the spray of hot syrup become extremely unpleasant for the operator, even if he is well protected with gloves and apron. The ideal way, and that usually employed elsewhere, is to close the cans on a fully automatic machine in which the cans pass to and from the machine without handling and the cans remain stationary during the seaming operations. Unfortunately it has been found, from experiments carried out at the Canning Research Station, that the local hand-made cans cannot be closed satisfactorily on a fully automatic machine owing to the comparatively wide variations in their dimensions. Trials carried out closing hand-made cans on an automatic machine showed losses due to damaged or leaky cans of between 5 and 10 per cent., which, coupled with the stoppages in order to extricate the damaged cans, would represent considerable losses on a day's run. Similar trials using imported machine-made cans were entirely satisfactory, losses of less than $\frac{1}{2}$ per cent. being recorded.

An alternative would be to use semi-automatic machines of a type where the can remains stationary during closing. A distinct disadvantage as compared with a fully automatic machine is that the maximum capacity for a semi-automatic is 35 cans a minute as compared with a capacity of from 60 to 120 cans a minute for a fully automatic machine. A semi-automatic machine is on order for the purpose of obtaining definite data as to its suitability or otherwise to local conditions of work.

On the other hand it may be possible to improve the locally-made can sufficiently to make its use with a fully automatic machine practicable, with or without some form of preliminary automatic gauging and discarding of such cans as are outside the limits of tolerance of the fully automatic machine. Preliminary investigations have shown that, considering the conditions of manufacture, local cans are extremely well made, denoting very great skill on the part of the can makers. One marked fault noted is that nearly all the mandrels, around which the can bodies are bent to facilitate soldering the side seam, are so worn and out of shape that it is surprising that the variation in size is not very much greater than investigations have shown. Body-soldering mandrels have been ordered from England and further investigations into the possibilities for improvements of locally hand-made cans must await their arrival. The obvious alternative would be to change over to machine-made cans and

this may have to be the ultimate solution. The possibility has received consideration but in view of the skill shown to be possessed by the Chinese can makers it is felt that the capabilities of the locally hand-made can must be fully explored before it can be advocated that a change over to machine-made cans should be made, entailing, as it necessarily would, a considerable capital outlay. In any case, existing circumstances make the establishment of a central can-making plant in Malaya unlikely for the present.

*The Use of Rubber Solutions for Closing.*

The present use of rubber rings applied by hand is unsatisfactory for several reasons, one of which is that the variation in thickness of the rings often causes particles of rubber to be squeezed inside the cans during the seaming process. Complaints regarding this have been received from time to time.

Machines for applying rubber solution to can ends are installed at the Canning Research Station and the results, using an imported rubber compound, have been entirely satisfactory. Demonstrations of the machines in operation have been held and several of the canners expressed themselves in favour of installing similar equipment. At present the high cost of the imported rubber solution is a deterrent; consequently experimental work is being carried out at the Station, using concentrated latex and other rubber compounds which could be manufactured locally comparatively cheaply, and the results so far obtained have been very promising.

Investigations to find Pineapples of Average Weight.

For the purpose of calculations the canners state that 70 fruits of an average size are required to fill 1 case of 48—1½ lb. Squat cans with cubes. Canning trials were carried out to find out the actual weight of pines of average size. Pines from various districts were taken and divided into batches containing pines of similar weight; each batch was then cut separately into cubes and the cubes filled into 1½ lb. Squat cans and the number of cans filled noted. From these figures the number of pines required to fill 48—1½ lb. Squat cans was calculated. Similar trials were carried out with Sarawak pines and the results plotted in the graph below, from which it will be noted that 70 Singapore fruits of an average weight of 3 lbs. are required to fill 1 case of 1½ lb. cans. It is interesting to note also that Sarawak pines give a better yield of fruit than Singapore pines; this is due to their having shallower eyes than the Singapore Canning pineapple, only 55 Sarawak pines of 3 lbs. weight being required to fill one case.

During these trials, records were kept of the weights of fruit before and after cutting, and from these the percentage recovery of cubes and slices was calculated.

| Variety of Pineapple | Average Percentage Recovery by Weight | | | | |
|---|---|---|---|---|---|
| | Fruits under 2 lbs. | Fruits 2 to 3 lbs. | Fruits 3 to 4 lbs. | Fruits 4 to 5 lbs. | Fruits over 5 lbs. |
| Singapore Canning Cubes ... | 20.2 | 19.4 | 20.7 | 20.3 | — |
| Sarawak pines Cubes ... | — | 21.8 | 24.8 | 23.6 | 27.2 |
| S'pore Canning R.C. Slices 1½ lb. Tall Cans ... | — | 22.2 | 27.2 | — | — |
| Sarawak pines R.C. Slices 2½ lbs. Tall Cans ... | — | — | 30.0 | 34.5 | — |

General Research Work.

Other research work, covering such subjects as pineapple waste utilization, can-lacquering trials, composting pineapple waste, the manufacture of pineapple jam etc. has been carried out.

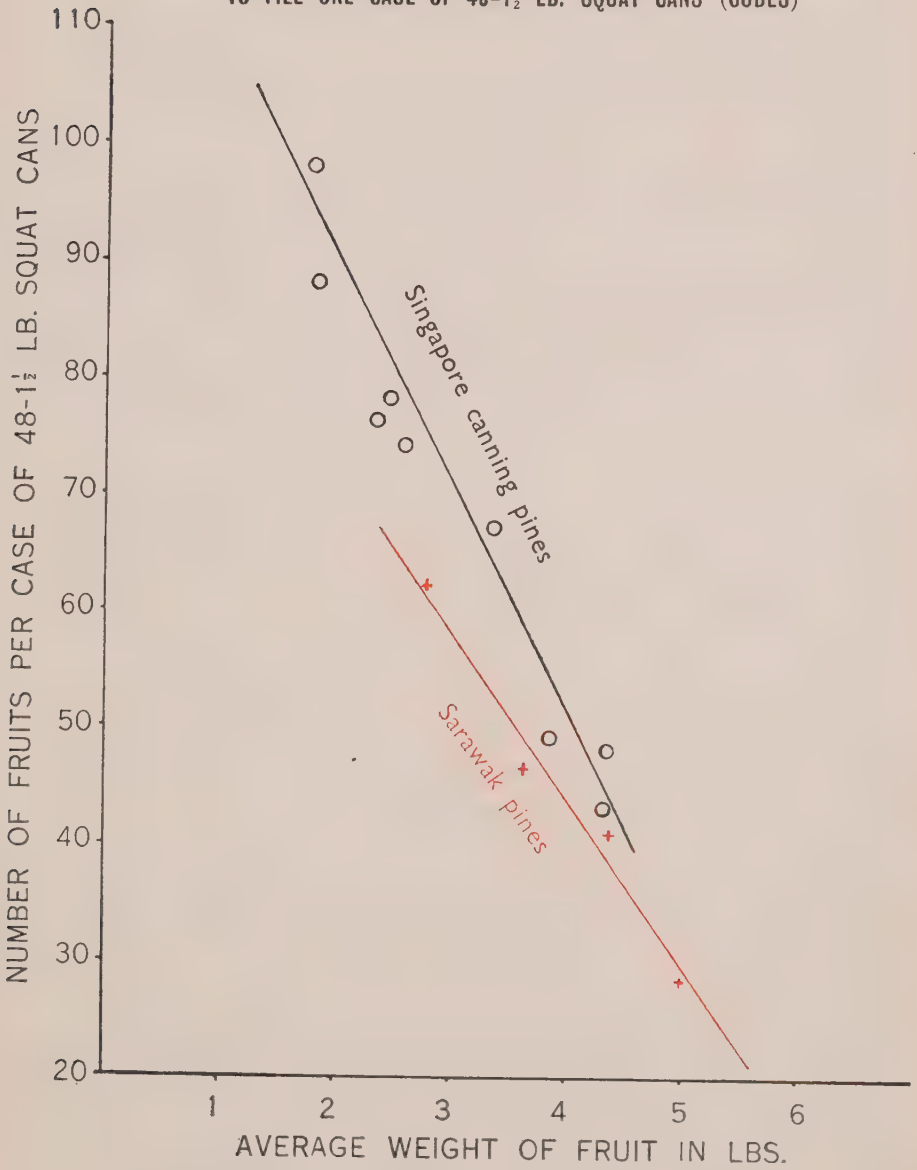
## General.

Following the formation of the Central Board in October, 1938, up to the outbreak of the war, conditions in the industry improved steadily; prices had risen and were maintained at profitable levels, the growers were receiving fair prices for their fruit, and the market for canned pineapple was on the up-grade. A general improvement in the quality of the pack could be noticed during the two years, but little progress had been made with the re-equipment of the factories with up to date machinery.

Since the outbreak of war the position of the industry has become somewhat precarious. Very large increases in the cost of tinplate and other materials required for canning have made it necessary for the Centrol Board to increase their selling price considerably. All existing contracts and exports of canned pines to Great Britain were taken over by the Ministry of Food in May, and over 80 per cent. of the normal exports to Canada have been lost due to an import ban on all but Golden grade fruit going into Canada.

*Received for publication 15th August, 1940.*

GRAPH SHOWING THE NUMBER OF PINEAPPLES OF VARIOUS WEIGHTS REQUIRED TO FILL ONE CASE OF 48-1½ LB. SQUAT CANS (CUBES)



# QUARTERLY REPORT ON THE MALAYAN PINEAPPLE CANNING INDUSTRY.

**June to August, 1940.**

*Prepared by the Economics Branch of the Department of Agriculture, S.S. and F.M.S. from Reports of Field Officers.*

## Factories.

There are 20 registered factories in Malaya, four of which are peeling sheds; nine factories and three peeling sheds are in Johore, five factories are in Singapore, and three in Selangor, one being a peeling shed.

In Johore, owing to labour troubles only one factory operated during June. A settlement of the strike early in July permitted the re-opening of four factories, but two of these closed down in the second half of the month owing to the uncertainty of the future of the industry. With the end of the fruit season approaching only one factory operated intermittently during August. In Selangor one factory and the peeling shed operated up to 15th July.

## Prices.

The prices of canned pineapples as fixed by the Central Board of Pineapple Packers remained unchanged, and were as follows, per case of 48 cans of $1\frac{1}{2}$ lbs. each.

| | General Average Quality (G.A.Q.) | Golden |
|---|---|---|
| | $ | $ |
| Sliced Flat ... | 4.80 | 5.40 |
| Sliced Tall ... | 4.95 | 5.55 |
| Cubes ... | 4.85 | 5.45 |

## Production and Sales.

The total of unsold stock at which packing should cease was increased from 300,000 to 450,000 cases.

Exports of Malayan canned pineapples for the three months subsequent to the last quarterly report were as follows:—May 4,948 tons, June 6,019 tons, July 3,079.

All imports of canned pineapples into the United Kingdom are now made through the Ministry of Food, but up to the end of the period under review no orders had been received from that Ministry apart from those taken over on contracts existing in early May as reported in the last Review.

In June restrictions were placed on the export of Malayan canned pineapple to Canada, and only shipments of Golden grade are now permitted. The restriction followed the restriction of the import of Canadian canned fruits into the United Kingdom with the consequent Canadian surplus production to be absorbed in the domestic market.

### Government Research Station and Canning Factory.

Further investigations were made into the possibility of using locally-made rubber compounds for sealing cans, and over 300 cans were sealed with eight different compounds supplied by the Rubber Research Institute of Malaya.

Canning trials were carried out to investigate the causes of variation in the final density of syrup in cans of pineapple. It was found that the two main factors affecting the final density are the ripeness of the fruit and the weight of fruit in the can. Briefly, the results showed that the riper the fruit the less sugar is absorbed.

Tests were carried out to find out the changes in volume and weight of the pineapple in a can during canning using various processes. The results showed that the decrease of volume and weight caused by processing is independent of the length of storage time and the ripeness of the fruit. The decrease in weight due to processing was approximately 11 per cent. and the decrease in volume approximately 20 per cent. It was also found that the exhaust process caused a slightly greater decrease in volume and weight than the non-exhaust process.

A series of pH determinations were made on Singapore Canning and Sarawak pineapples in various stages of ripeness. The results indicated that as ripeness of the fruit increases, acidity diminishes; maximum variations of pH 3.2 to pH 4.7 were recorded. It was also found that the pH varied in different parts of the same fruit, the pH being greater near the bottom of the fruit where it is riper.

Samples of pineapple jam were made and canned, and it was found that with the addition of a little citric acid or lime-juice a very palatable and attractive jam could be made.

Further trials were carried out canning pineapple juice from locally-grown pineapples of the Sarawak variety. A simple process was evolved which produced a juice of good fresh flavour which compared favourably with Hawaiian juice.

### General.

There was no change in acreages under pineapple, but the area under cultivation is likely to show considerable reduction by the end of the year owing to neglect of the plantations by the growers.

Fruit supplies in Johore fell off early in August, and packers were unable to fill their quota owing to lack of fruit. The yielding capacity of the older lands is rapidly diminishing.

The uncertainty of the future of the industry has tended to curtail work on pineapple lands, and many areas are rapidly becoming over-grown with *lalang* grass and jungle growth. The quantity of fruit available during the next canning season is likely to show a considerable decrease compared with the small season crop last year.

## Abstract.

# EXPERIMENTS ON THE MANURING OF TEA IN INDIA.

Experiments with cattle manure, humus composts and unfermented organic waste materials on mature tea in bearing are described in a recent publication of the Indian Tea Association*. The author points out that the conclusions arrived at do not necessarily apply to other crops than tea, or even to young tea.

Fresh organic matter probably has a value of its own in some instances, and young tea, newly planted on old exhausted soil, is believed very frequently to provide one of these instances. Reasonably good mature tea, it is stated, is unlikely to require any more organic matter than it receives in the form of its own prunings, which provide annually at least 1 ton per acre of ash-free, dry, organic matter. When, in addition to prunings, the soil receives large additions of fallen leaves from good shade trees, it is extremely unlikely that the occasional application of 5 tons per acre of humus compost (containing about $\frac{1}{2}$ ton of organic manure) can make any material difference.

### Comparison of Composts with Artificials.

In each of eight widely-separated experiments and on six completely different types of soil at least one type of fermented compost was compared with either sulphate of ammonia alone, or an artificial mixture supplying nitrogen as sulphate of ammonia.

In no case was there any sign of advantage from a humus compost which could be ascribed to its content of organic manure, or any "auxiliary food factor." On the contrary, the effect of the artificial averaged about $2\frac{1}{2}$ times that of the humus compost for the same quantity of nitrogen.

In what appear to be normal cases, when neither phosphoric acid nor potash exercises any effect of importance, an application of 1 ton cattle manure or humus compost has the value of not more than $5\frac{1}{2}$ lbs. of nitrogen as sulphate of ammonia, that is, of about 27 lbs. of sulphate of ammonia. To render the use of compost remunerative its cost must be less than one half the cost of the same quantity of nitrogen as artificial.

In two cases where sulphate of ammonia failed to increase growth, humus compost was equally ineffective. This indicates that there is no effect from humus compost apart from that of the nitrogen it supplies.

### Comparison of Raw (Unfermented) Waste Material with Similar Material after Composting (Fermentation in Moist Heap).

Better results were obtained by applying unfermented materials direct to the soil than by applying such materials after fermentation in heaps or pits.

The cost of manufacture of the compost is avoided and also part of the transport cost. Unless the composition of the mixture and its manufacture are very

* Tocklai Experimental Station. Memorandum No. 11. "Experiments with Cattle Manure, Humus Composts and Unfermented Waste Material" by H. R. Cooper. July, 1940.

much more carefully controlled than is possible under estate conditions, nitrogen is always lost during composting. Application of unfermented material is therefore much cheaper than application of fermented humus compost to give the same quantity of nitrogen. For the same quantity of nitrogen, the unfermented materials are at least as efficient before fermentation as afterwards.

During the course of the experiments it was observed that leaves and green stems rot very rapidly, while woody twigs and certain other resistant materials rot so slowly that they take no effective part in the reaction. However carefully the mixture for composting is made up, there is always too low a ratio of organic matter to nitrogen in places, and from these places very soluble forms of nitrogen are rapidly leached out, so that nitrogen is lost. The nitrogen which remains is in in forms less readily available as plant food.

The assumption that composting must increase the availability of the nitrogen in the raw materials is therefore found to be incorrect. In the soil, leaves and such available forms of nitrogen give their full effect rapidly, and their action is not retarded by the presence of slowly-rotting wood.

**The Use of Readily Available Nitrogen together with Jungle Cuttings.**

. The availability of the nitrogen in organic materials is greater as the ratio of organic matter to nitrogen is less. For materials like cuttings of the shrub *Eupatorium odoratum*, there has been shown to be no advantage in using a form of available nitrogen together with the cuttings. The leaves and green stems (which have a low ratio of organic matter to nitrogen) behave like a quick-acting nitrogenous manure, while the woody parts (with a very high ratio of organic matter to nitrogen) rot very slowly without interfering with the action of the leaves.

## Conclusions.

For mature tea it is recommended that the making of humus composts should cease. The operation is costly, it causes loss of nitrogen, the forms of nitrogen which remain are less efficient than the forms in the original raw material, and no evidence can be found that it has any value beyond that of the nitrogen which it supplies.

It is suggested that all cattle manure and urine-soaked bedding from cattle houses should be collected and conserved in roofed pits protected from surface water by drains. This material may be augmented by any jungle cuttings and other suitable material that may be available in the vicinity of the pit.

For infillings far from lines, organic waste material from cleanings of roads and borders of estates should be made into heaps at convenient spots. It is probably an advantage to sprinkle each heap of about 10 tons organic rubbish with 20 lbs. Nicifos as a "starter."

On estates with areas of scrub jungle in the neighbourhood of the tea, the jungle may be cut, tied into bundles, dried in the sun and carried into the tea. It is important to remember that the leaf is the valuable part: 3 to 6 tons per acre of this partly dry material are suggested as suitable dressings.

# Reviews.

## Malay Leaf and other Vegetables and their Analyses.

*By J. L. Rosedale and J. N. Milsum. Special Bulletin, General Series No. 31. Department of Agriculture, S.S. & F.M.S. 21 pp. Price 50 cents (Malayan), post free.*

The fact is perhaps insufficiently appreciated by those who urge the extension of vegetable production that many of the vegetables habitually eaten by the Malays are little known to other nationalities in this country. It does not follow that because some of these vegetables are found in waste places or require the minimum of cultivation that they are in any way inferior to the better known and more widely cultivated vegetables. In fact, ease of production is an added recommendation provided that it can be shown that the vegetables in question possess a satisfactory food value.

It would, however, be incorrect to infer that the present production of vegetables by Malays is sufficient in quantity or that it is necessarily adequate in quality to meet requirements, and the necessity for increased production locally and the wider use of the less well-known vegetables are more urgent now than at any time before. For reasons of health vegetables should form an important part of the diet, but the authors of this valuable contribution admit that no exact information is available regarding the quantities of vegetables eaten by Malays, but add that this point is receiving separate attention in the nutritional surveys which are in progress in some parts of the country.

In this bulletin the authors set forth their investigations of 62 vegetables, mostly collected from one District, which are grown and offered for sale in the local markets, although many of them are unappreciated by the non-Malay population. These vegetables are identified and described; information is given on the methods of preparation for consumption; and the table of analyses shows the food value of each vegetable and indicates that many of them have a high food value.

This publication draws attention to an important aspect of food production in Malaya and provides data of value for further investigations on this subject.

D.H.G.

## Seed and Potting Composts with Special Reference to Soil Sterilization.

*By W. J. C. Lawrence and J. Newell. Published by George Allen and Unwin Ltd. London 1939. Price three shillings and sixpence.*

The keen horticulturist will find in this book information which will help to explain many if not all the causes of failure consistently to obtain satisfactory results with pot plants. The authors, who are the Curator and Assistant Curator respectively of the John Innes Horticultural Institution, Merton, England, have studied

exhaustively methods of preparing seed and potting composts which, to quote Sir Daniel Hall, K.C.B., F.R.S., LLD., who has written the Foreword to the book, "fulfil the definition.....of being scientific—they will give the same results every time they are tried."

While the book refers purely to methods of obtaining consistent results with pot plants under glass in a temperate climate the clear explanation given of how to overcome the deterimental effects of soil sterilization on germination and young seedlings, how to prepare a standard compost which dispenses with stable manure, and how to feed pot plants should also be exceedingly helpful to horticulturists in climates where glass house cultivation is not practised.

The authors indeed merit the tribute paid by Sir Daniel Hall when he states "I regard their work as one of the most exact and valuable pieces of science applied to horticulture that has fallen within my experience."

A.T.

**Rubber Statistics Handbook, 1940.**

*Compiled by the Department of Statistics, S.S. and F.M.S. Government Printing Office, Singapore, 1940. Price $1.50 (Malayan currency).*

This annual handbook of rubber statistics gives the Malayan acreage, production, imports, exports and consumption of rubber corrected up to the end of 1939. The book is conveniently arranged in nine Sections, dealing respectively with Malaya, the Straits Settlements, the Federated Malay States, and each of the Unfederated Malay States. The present edition follows the lines of those previously published and efforts have been made so far as possible to publish uniform information for all Administrations.

Of the world's production of rubber estimated for 1939 at 1,001,931 tons, 37.5 per cent. was produced in British Malaya, 37.1 per cent. in the Netherlands Indies, and 25.4 per cent. in other countries. This volume of tables, therefore, gives authoritative statistical information concerning the production of more than one-third of the world production in 1939.

# Notes and Comments.

## CONTROL OF NITROGENOUS FERTILISERS ORDER, 1940.

The Adviser on Agriculture in his capacity as the Competent Authority under Regulation 54 of the Emergency Regulations 1939 has made an Order with effect from 24th September, 1940, with the object of ensuring that available supplies of nitrogenous fertilisers shall be used to the best advantage. The Order states, *inter alia*,

"No person either on his own account or on account of any other person shall import any nitrogenous fertiliser unless authorised in writing to do so by the Competent Authority.

"Every importer or dealer shall, notwithstanding any contract entered into by such importer or dealer for the supply of nitrogenous fertilisers, give preference to persons (or Estates) who require such nitrogenous fertiliser for application during 1940 to replanted rubber, provided that requests for supplies be received within 30 days of issue of this Order." No. 4961B Supplement to the F.M.S. Gazette, 24th September, 1940.

A similar order has been issued in the Straits Settlements Gazette, Notification No. 3345.

The last number of *The R.R.I. Planters' Bulletin* dated September, 1940, discusses the reason for this priority in the use of nitrogenous fertilisers at the present time. In this publication the relative order of importance for the continuation of nitrogen manuring for rubber according to programme is stated as follows:—

"1. Areas replanted (or planted after exhaustion by another crop) later than 1936.

"2. (a) Immature areas replanted (or planted on previously cropped land) before 1937.

(b) Mature areas which are being manured for recovery from deterioration and have received only one or two dressings already.

"3. (a) Immature areas originally planted on newly-cleared jungle.

(b) Mature areas not showing any sign of deterioration, which are being manured for maintenance, not for recovery.

"The relative priority of (a) and (b) under 2, and similarly under 3, cannot be stated with certainty, and will depend on a detailed consideration of the circumstances in each individual case. On coastal clays and peat areas manuring is usually unnecessary for rubber of any age."

Sulphate of ammonia is to be preferred to nitrate of soda for manuring of tea and it is understood that consideration has been given to the claims of tea planters for supplies of the former fertiliser. Any Malayan tea estates who desire a supply of sulphate of ammonia, and have not yet reserved it should make early application to their usual suppliers.

## MALAYAN CONSUMPTION OF TEA.

The figures of Malayan consumption of tea have been revised. The following table shows the present accepted figures, which correct and amplify the statement in *The Malayan Agricultural Journal*, May, 1940, page 214.

**Malayan Consumption of Tea.**

lbs.

| Year | Imported Tea* | Malayan Estate Tea† | Malayan Small-Holders' Production (Estimated) | Total | Percentage Malayan Consumption produced locally. |
|---|---|---|---|---|---|
| 1930 ... | 8,768,183 | 59,310 | 250,000 | 9,077,493 | 3.4 |
| 1931 ... | 6,876,748 | 95,662 | 250,000 | 7,222,410 | 4.8 |
| 1932 ... | 4,459,855 | 126,262 | 250,000 | 4,836,117 | 7.8 |
| 1933 ... | 3,300,559 | 148,955 | 250,000 | 3,699,514 | 10.8 |
| 1934 ... | 4,561,158 | 217,299 | 250,000 | 5,028,457 | 9.3 |
| 1935 ... | 4,461,532 | 204,014 | 250,000 | 4,915,546 | 9.2 |
| 1936 ... | 4,545,975 | 289,950 | 250,000 | 5,085,925 | 10.6 |
| 1937 ... | 5,263,681 | 411,544 | 250,000 | 5,925,225 | 11.2 |
| 1938 ... | 4,213,219 | 434,624 | 250,000 | 4,897,843 | 14.0 |
| 1939 ... | 4,181,677 | 618,472 | 240,000 | 5,040,149 | 17.0 |

* Imports—(Exports—Exports Malayan tea).
† Sales for local consumption as declared by estates.

## MALAYAN TRADE IN COCONUT PRODUCTS 1939.

The imports of copra in 1939 amounted to 123,009 tons and exports to 157,430 tons, as compared with 117,517 tons and 186,271 tons respectively in 1938. (This statement was inadvertently omitted from the footnote to Table 19 of Malayan Agricultural Statistics 1939, published as Special Bulletin, Economic Series No. 11.)

The total imports of coconut products in 1939 were 124,920 tons, valued at $7,278,142, while exports during this period were 238,355 tons, valued at $18,306,501.

## PACKING TEA FOR EXPORT.

In normal times it is customary to pack tea in cases which are lined with tin or aluminium foil. War conditions have resulted in a considerable increase in price of such linings and investigations have been made of other materials which, while protecting the tea, are reasonable in price and more easily obtainable than tin or aluminium foil.

*The Ceylon Tea Quarterly* for April, 1940, discussed this subject in the following words:—

"On the outbreak of war considerable uncertainty prevailed as to future supplies of aluminium foil for tea chest linings and this is still the case. Under the conditions of the Government contract teas have to be packed in chests lined with aluminium or lead foil or such other materials as may be specifically approved by the Ministry of Food in London. As is well known the Institute has already carried out numerous tests on various alternative linings such as Kraft Paper, Pliofilm, Cellophane, etc., and was satisfied that some of these materials were entirely suitable for use as linings. In regard to Kraft Paper numerous shipments were also made by estates with, so far as is known to the Institute, entirely satisfactory technical results. Opposition was, however, met with from buyers owing to the fact that these materials in contrast to the conventional metallic linings had little or no second-hand value. It was felt, however, in view of war conditions in which supplies of aluminium and lead must necessarily be diverted for military purposes, such an objection would no longer be sustained. It was considered, therefore, in the interests of the Tea Industry that representations should be made to the Ministry of Food urging that the use of alternative tested materials such as Kraft Paper should be made permissible. In the event of any deterioration in the position as regards supplies of metal foils it would then have been possible to change over to such alternative materials without undue delay or inconvenience.

It is to be regretted, however, that these representations have so far been unsuccessful. While permission for the use of Kraft Paper has been given in certain cases for special reasons, the Minister for Food, London, has intimated that he is not at present prepared to issue any general permit for the use of this material."

Consequent upon enquiries of exporters of Malayan tea to the Ministry of Food in the United Kingdom, the Tea Commissioner, Malaya, cabled the Ministry asking whether tea cases must be lined with lead or aluminium or whether other protective material might be used. In reply it was stated that paper lined metallic lining could be used and that if other linings are employed recourse will remain against contractors in case of damage, contamination or claims from buyers.

## GIFTS OF TEA TO INDIVIDUALS IN THE UNITED KINGDOM.

In reply to an enquiry, the Ministry of Food has stated that under the Ministry's regulation, which covers tea and any other foodstuffs, whether rationed or not, bona fide unsolicited gifts may be received in the United Kingdom from abroad provided that they are addressed to individuals and sent by parcel post. No permit is required. All parcels must be clearly marked as gifts.

If gifts are reshipped in bulk for redistribution for individuals in the United Kingdom, the maximum weight of each parcel must not exceed the maximum allowed by United Kingdom parcel post, *viz.* 15 lbs.

# Departmental.

## FROM THE DISTRICTS.

*Compiled in the Office of the Chief Field Officer from Monthly Reports of Agricultural Officers.*

**September, 1940.**

### The Weather.

In most parts of the country the weather has been seasonable: cool and with frequent rain.

### Crop Reports.

*Rubber.*—The general level of prices remained unchanged. The price of uncouponed rubber has, however, increased to as much as $25 per picul in some places. This has resulted in some increase in tapping of small holdings in those districts where frequent rain did not hold up work.

In Kelantan the reassessment of small holdings has led to a large decrease in coupon issues in the coastal plain but holdings in inland areas have benefited.

Reports from many parts of the country mention replanting by small-holders. From Negri Sembilan it is reported that some excellent replanting is being done by owners of small estates and by some small-holders, by far the best being the Chinese and Indian owned holdings. Malay owners are not doing such good work as they do not pay sufficient attention to maintenance and some also will not apply enough manure.

No difficulty is at present being experienced in providing budwood for replanted holdings, as many estates in different parts of the country have areas planted with T.J. 1 and 16 and budwood is available from these areas at quite a low price. Budwood of Pilmoor and Prang Besar clones will in due course be available at Agricultural Stations for use by small-holders.

*Padi.*—The rains enabled padi planting to go ahead. Heavy rain at Kota Star and Kubang Pasu in Kedah resulted in floods, and padi on an area 454 acres was submerged and killed. Damage by crabs has been more than usually severe in these localities.

Lack of water during the dry month of August considerably delayed planting in some areas in Krian and it was only towards the end of September that water supplies in these areas became sufficient to allow cultivation to proceed. Seed of short term varieties of padi has been supplied to some of those planters in south Krian who lost their nurseries in the drought.

At Sungei Manik in Stages I and II the water supply has been rather uneven and some quite extensive areas have been partially or entirely dependent upon rainfall, so although progress with planting has, as a whole, been good some delay

occurred in these areas. In Stage III efficient water control is not possible as bunding is not complete. In the cleared areas of Stage III wet and dry padi, maize, tapioca and colocasia have been planted. In Stage IV lots were pegged out and colonists were put into occupation during the month. Seed of dry and short term padi has been on sale on the spot and many of the settlers have planted up their holdings by direct dibbling. It is hoped that it will be possible to provide settlers with part-time employment in this area with the Drainage and Irrigation Department so that they may remain and work on their holdings until they are self-supporting.

In Negri Sembilan shortage of water during the previous month caused some delay in planting in certain places. Now, however, water is ample and the position at present shows a very great improvement on last season, especially in Kuala Pilah District where last year, owing to unfavourable weather, practically no padi was planted. This year the total acreage cultivated should return to normal. It is, however, doubtful whether some of the areas where planting has been delayed owing to water shortage will be planted now that the fasting month has commenced.

In Central Malacca planting has again been late owing to water shortage: and to add to the trials of the cultivators an acid condition of the water used for irrigation has now manifested itself in certain areas, which has caused the death of nurseries and also of planted padi in some instances. This problem has been referred to the Soils Chemist for investigation.

In the Raub and Kuala Lipis Districts of Pahang conditions are not promising and lack of water has been general. Cultivators appear to have decided that this season's crop will be poor. Elsewhere in Pahang water is more plentiful and planting is going ahead.

*Coconuts.*—The price of copra has risen slightly but business shows no increase. Owners of kilns continue to store their nuts and copra hoping for a further rise in price.

## DEPARTMENTAL NOTES.

### Appointment.

Mr. P. G. Coleman, B.A. (Agr.), has been appointed to be an Agricultural Officer, Department of Agriculture, S.S. & F.M.S., with effect from the 31st July, 1940. Mr. Coleman arrived on 30th September, 1940 and has assumed duty as an Agriculturist at the Central Experiment Station, Serdang.

### Leave.

Mr. R. G. Heath, Agricultural Officer, returned from leave on 15th September, 1940, and assumed duty in the post of State Agricultural Officer, Selangor, with effect from 17th September inclusive.

# Statistical.

## MARKET PRICES.

### September, 1940.

### Major Crops.

*Rubber.*—The Singapore market was notably steady during the month, No. 1. X. Ribbed Smoked Sheet varying only between 37⅜ and 37¾ cents per lb. The average of daily quotations for the month was 37.55 cents per lb. as compared with 37.33 cents in August. The London average price was 11.98 pence per lb., and New York 19.13 cents gold, as compared with 12.84 pence and 19.43 cents gold in August.

Prices paid for small-holders' rubber at three centres during the month are given in Table 1.

### Table I.

### Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, September, 1940.

(Dollars per picul of 133 1/3 lbs.)

| Grades | Kuala Kangsar, Perak | | | | Kuala Pilah, Negri Sembilan | | | Batu Pahat, Johore. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 11 | 18 | 25 | 12 | 19 | 26 | 11 | 18 | 25 |
| Smoked Sheet ... | 44.50 | 43.96 | 44.00 | 43.50 | 45.00 | 43.13 | 43.50 | — | 43.00 | 42.90 |
| Unsmoked Sheet ... | — | — | 40.00 | 40.00 | 43.00 | — | — | 40.45 | 40.00 | 40.20 |
| Scrap ... | — | — | — | — | — | — | — | — | — | — |

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8 per ton.

Transport from Batu Pahat to Singapore by lorry, excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

No purchases of rubber at Batu Pahat on the 4th September, and at Kuala Pilah on the 5th September.

*Palm Oil.*—No recent information is available regarding prices paid in the United Kingdom.

Local sales of palm oil in sellers' drums were made in September at the following prices:—bleached oil 5 per cent. f.f.a. $175 per ton f.o.b. Singapore; unbleached oil 5 per cent. f.f.a. $165 per ton c.i.f. Colombo, delivery October/November 1940.

*Copra.*—There was a slight improvement in price in the second half of the month following demand from the Singapore oil mills and a report that the Ministry of Food in the United Kingdom was considering re-opening buying of Malayan copra.

The sun-dried grade improved from $2.30 to $2.50 per picul in Singapore, averaging $2.39 as against $2.43 in August. The mixed grade continued 25 cents per picul below the sun-dried grade.

Coconut oil was sold in Singapore during the month at an average price of $7.50 per picul.

Copra cake remained unchanged at $1.10 per picul.

*Rice.*—The Singapore average wholesale price for Thai No. 2 Broken (White) was $4.79 per picul, and for Rangoon Parboiled No. 2 $5.27. There were no dealings in the remaining grades usually quoted in this report.

*Padi.*—The Government Rice Mills, Perak, are paying a guaranteed price of $2.50 per picul for padi, plus a bonus of 10 cents per picul for pure strain S.K. 48 padi. The Government Rice Mill, Temerloh, Pahang, continued to pay $2.25 per picul during September.

Retail prices of padi in cents per gantang (gallon) were as follows:—Province Wellesley and Penang 14, Perak Central 10 to 18, Perak South 15 to 17, Pahang South 11 to 15, Pahang North 10 to 25, Pahang East 12 to 15, Negri Sembilan 10 to 15, Malacca 15 to 18, Kedah 9½ to 10, Kelantan 11¾.

*Pineapples.*—There was a certain amount of restricted buying of the canned product during September at the fixed prices which remained unchanged. Fresh fruit prices also remained unchanged and there was little buying.

## Beverages.

*Tea.*—There are no London tea sales.

The latest Colombo prices available, quoted from *The Ceylon Tea Market Report* of 1st October, 1940, of the Colombo Brokers' Association, are as follows in rupee cents per lb.:—

High Grown Rs. 1.08, Medium Grown 93 cents, Low Grown 79 cents.

*Coffee.*—Liberian coffee was quoted throughout the month in Singapore at $14.50 per picul. Excelsa fell from $12 to $11.50, averaging $11.88, and Robusta fell from $9 to $8.50, averaging $8.75 per picul.

The average of highest and lowest quotations in Singapore for Palembang coffee was $10.06 to $11.69 per picul, and for Sourabaya coffee $11.62 to $13.81. The August average prices were $10.10 to $11.75 and $11.35 to $13.13 respectively.

## Spices.

*Arecanuts.*—The average of the Singapore Chamber of Commerce quotations per picul, which were stated to be approximate, were:—Best $6.25, Medium $5.75, Mixed $5.25, as compared with $6, $5.71 and $5.35 respectively in August.

The averages of the highest and lowest quotations per picul in Singapore were as follows:—Splits $4.25 to $7.31, Red Whole $4.62 to $7, Sliced $8.87 to $10.81, as compared with $3.95 to $5.80, $4.15 to $6.15 and $7.93 to $10.65 respectively in July.

*Pepper.*—Singapore Black was quoted throughout the month at $6.25 per picul and Muntok White at $12, as compared with $6.50 and $12.50 respectively in August. The market for Singapore White continued nominal with no quotations.

*Nutmegs.*—110's fell from $21 to $20 per picul, averaging $20.50, as compared with the August price of $21. 80's remained unchanged at $22 per picul.

Penang dried nutmegs were sold at $19 per picul.

*Mace.*—Siouw remained a nominal market with no quotations. Amboina fell heavily from $36 to $28 per picul, averaging $33, as compared with $37.60 in August and $44 in July.

Locally produced mace, dry was sold in Penang at $55 per picul.

*Cloves.*—Remained a nominal market with no quotations.

*Cardamoms.*—Green cardamoms were quoted in *The Ceylon Chamber of Commerce Weekly Report* of 16th September, 1940, from Rs. 1.30 to Rs. 1.46 per lb.

## Miscellaneous.

*Derris.*—The increased demand for root of 5 per cent. rotenone content and over continued during September, and prices were well maintained and in some cases showed slight advances except for *Derris malaccensis.* Average prices per picul for the month were as follows:—$9 to $10 for root sold on a basis of ether extract, $20 to $22.50 for root with 4 to 5 per cent. rotenone content, rising to $27 to $28.50 for 7 to 9 per cent. rotenone.

*Gambier.*—Block remained a nominal market with no quotations. No. 1 Cube fell from $14.50 to $13.50, but recovered to $14, averaging $14 per picul as compared with $15.70 in August.

*Sago.*—Pearl was quoted throughout the month at $6 per picul as compared with the August average of $5.75. Flour, Sarawak Fair, improved from $2.60 to $2.70 per picul, averaging $2.68 as compared with $3.28 in August.

*Tapioca.*—Flake Fair and Seed Pearl fell from $7 to $6.50 per picul, averaging $6.62 as compared with $7 in August. Medium Pearl fell from $8 to $7.25, averaging $7.44 as compared with $8 in August.

*Tobacco.*—Prices of prepared tobacco per picul in Kelantan during September were:—1st quality $120 to $170, 2nd quality $80 to $135, 3rd quality $45 to $115. The range of dried leaf prices was as follows:—Penang and Province Wellesley 1st quality $45, 2nd quality $32, Pahang North 1st quality $25 to $35, 2nd quality $15 to $25, 3rd quality $6 to $18, Negri Sembilan $25 to $28, $15 to $25, $8 to $18, Malacca $37 to $39, Perak Central $40, $20, $12, (cut tobacco $53, $37), Perak South $45, $40, $35, (prepared tobacco 70 to 75 cents per kati).

The above prices are based on London and Singapore daily quotations for rubber, on the Singapore daily prices for copra, on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports and certain coffee prices are kindly supplied by Guthrie & Co., Ltd., Kuala Lumpur, local palm oil prices by Whittall & Co., Kuala Lumpur, the Singapore prices of imported coffee and arecanuts by Lianqui Trading Company of Singapore, and Singapore derris prices by Hooglandt & Co., Singapore.

1 picul = 133 1/3 lbs. The dollar is fixed at 2s. 4d.

*Note.*—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Trafalgar Square, London, W.C.2.

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## FERTILIZER PRICES, OCTOBER, 1940.

The following are the prices current for the month of October, 1940, of some of the more important fertilizers.

| Product. | Analysis | | | | Price per ton $ |
|---|---|---|---|---|---|
| | Nitrogen (N) | Phosphoric Acid ($P_2O_5$) | | Potash ($K_2O$) | |
| | | Soluble | Insoluble | | |
| Sulphate of Ammonia ... | 20.6 | — | — | — | 133.00 (short ton) |
| Muriate of Potash ... | — | — | — | 60 | 200.00 |
| Superphosphate (concentrated) ... | — | 39 | — | — | 140.00 |
| Superphosphate ... | — | 16-18 | — | — | 75.00 |
| Basic Slag ... | — | 16* | — | — | 75.00 |
| Rock Phosphate (Christmas Island) ... | — | 11* | 38‡ | — | 37.00¶ |
| Lime ... | — | — | — | — | 20.00 |

* Citric soluble. ‡ Total ¶ $35.00 per ton *ex* warehouse, Singapore.

Supplies of calcium cyanamide, sulphate of potash and rock phosphate (Gafsa) are not available.

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham, Klang and Singapore.

## MALAYAN AGRICULTURAL EXPORTS, JULY, 1940.

| Product | Net Exports in Tons | | | | |
|---|---|---|---|---|---|
| | Year 1939 | Jan./July 1939 | Jan./July 1940 | July 1939 | July 1940 |
| Arecanuts ... | 38,489 | 21,934 | 28,261 | 1,950 | 5,701 |
| Coconuts fresh†‡ ... | 97,275† | 59,714† | 53,508† | 10,539† | 11,908† |
| Coconut oil‡ ... | 61,360 | 32,971 | 37,992 | 4,613 | 4,219 |
| Copra‡ ... | 34,420 | 16,521 | 6,584 | 4,902 | 4,522* |
| Copra cake ... | 10,707 | 4,659 | 4,370 | 849 | 28* |
| Gambier, all kinds ... | 1,572 | 887 | 494 | 103 | 63 |
| Palm kernels ... | 10,774 | 5,772 | 5,129 | 600 | 404 |
| Palm oil ... | 59,712 | 28,415 | 27,626 | 5,767 | 1,934 |
| Pineapples, canned ... | 65,802 | 54,624 | 30,949 | 7,929 | 3,079 |
| Rubber¶ ... | 361,484¶ | 189,835¶ | 308,503¶ | 36,746¶ | 47,882¶ |
| Sago,—flour ... | 9,583 | 3,745 | 208* | 302* | 4,061* |
| ,, —pearl ... | 3,883 | 2,040 | 2,078 | 267 | 179 |
| ,, —raw ... | 4,435* | 2,713* | 3,627* | 408* | 488* |
| Tapioca,—flake ... | 1,068 | 549 | 454 | 28 | 29 |
| ,, —flour ... | 2,706* | 1,574* | 1,351* | 13* | 293* |
| ,, —pearl ... | 18,277 | 9,744 | 8,882 | 1,465 | 1,370 |
| Derris ... | 1,356 | 658 | 797 | 12 | 115 |
| ‡Copra equivalent ... | 136,075 | 71,292 | 69,392 | 12,609 | 861 |

† hundreds in number. * net imports. ¶ production.

## MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates).

| Month 1940 | Palm Oil | | | Palm Kernels | | |
|---|---|---|---|---|---|---|
| | F.M.S. | U.M.S. | Malaya | F.M.S. | U.M.S. | Malaya |
| January ... | 2,007.6 | 2,474.0 | 4,481.6 | 434.3 | 497.0 | 931.3 |
| February ... | 1,937.9 | 1,914.7 | 3,852.6 | 411.1 | 454.0 | 865.1 |
| March ... | 2,081.5 | 1,895.6 | 3,977.1 | 445.3 | 388.1 | 833.4 |
| April ... | 2,104.3 | 1,820.7 | 3,925.0 | 420.8 | 370.0 | 790.8 |
| May ... | 2,124.3 | 2,054.1 | 4,178.4 | 414.5 | 401.0 | 815.5 |
| June ... | 2,128.8 | 2,696.0 | 4,824.8 | 268.6 | 505.0 | 773.6 |
| July ... | 3,217.7 | 2,886.4 | 6,104.1 | 531.4 | 529.2 | 1,060,6 |
| August ... | 3,801.2 | 3,049.9 | 6,851.1 | 343.1 | 389.8 | 732.9 |
| Total ... | 19,403.3 | 18,772.8 | 38,176.1 | 3,269.1 | 3,534.1 | 6,803.2 |
| Total January to August, 1939 ... | 19,616.3 | 17,982.0 | 37,598.3 | 3,553.7 | 3,023.1 | 6,576.8 |
| Total for the year 1939 ... | 30,157.7 | 27,215.0 | 57,372.7 | 5,639.3 | 4,533.1 | 10,172.4 |

Stocks on estates as at 31st August, 1940, were: palm oil 5,037 tons, palm kernels 3,285 tons.

ACREAGES OF TAPPABLE RUBBER ACTUALLY TAPPED AND NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 31ST AUGUST, 1940.

| STATE OR TERRITORY | Estimated Acreages of Tappable Rubber (9)+(11) | ACREAGES OF TAPPABLE RUBBER NOT TAPPED | | | | Area of tappable rubber never been tapped (b) | | Total area not tapped (3)+(5) (c) | | TOTAL AREA TAPPED DURING THE MONTH | | Area of tappable rubber rested under rotational systems (c) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | On estates which have entirely ceased tapping | | On estates which have partly ceased tapping (a) | | | | | | | | | |
| | | Acreage | Percentage of (3) to (2) | Acreage | Percentage of (5) to (2) | Acreage | Percentage of (7) to (2) | Acreage | Percentage of (9) to (2) | Average | Percentage of (11) to (2) | Acreage | Percentage of (13) to (2) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| S.S.— | | | | | | | | | | | | | |
| Province Wellesley ... | 42,260 | 114 | 0.3 | 8,072 | 19.1 | 500 | 1.2 | 8,186 | 19.4 | 34,074 | 80.6 | 8,436 | 20.0 |
| Malacca ... | 113,950 | 644 | 0.6 | 15,371 | 13.5 | 958 | 0.8 | 16,015 | 14.1 | 97,935 | 85.9 | 21,416 | 18.8 |
| Penang ... | 2,601 | nil | nil | 795 | 30.6 | 55 | 2.1 | 795 | 30.6 | 1,806 | 69.4 | 60 | 2.3 |
| Singapore ... | 30,417 | 4,340 | 14.3 | 5,487 | 18.0 | 295 | 1.0 | 9,827 | 32.3 | 20,590 | 67.7 | 3,405 | 11.2 |
| Total S.S. ... | 189,228 | 5,098 | 2.7 | 29,725 | 15.7 | 1,808 | 1.0 | 34,823 | 18.4 | 154,405 | 81.6 | 33,317 | 17.6 |
| F.M.S.— | | | | | | | | | | | | | |
| Perak ... | 277,847 | 2,494 | 0.9 | 32,279 | 11.6 | 4,852 | 1.7 | 34,773 | 12.5 | 243,074 | 87.5 | 37,633 | 13.5 |
| Selangor ... | 307,070 | 2,940 | 1.0 | 24,267 | 7.9 | 4,060 | 1.3 | 27,207 | 8.9 | 279,863 | 91.1 | 41,761 | 13.6 |
| Negri Sembilan ... | 254,287 | 4,521 | 1.8 | 31,809 | 12.5 | 5,934 | 2.3 | 36,330 | 14.3 | 217,957 | 85.7 | 28,660 | 11.3 |
| Pahang ... | 85,051 | 1,023 | 1.2 | 11,373 | 13.4 | 4,089 | 4.8 | 12,396 | 14.6 | 72,655 | 85.4 | 6,898 | 8.1 |
| Total F.M.S. ... | 924,255 | 10,978 | 1.2 | 99,728 | 10.8 | 18,935 | 2.0 | 110,706 | 12.0 | 813,549 | 88.0 | 114,952 | 12.4 |
| U.M.S.— | | | | | | | | | | | | | |
| Johore ... | 469,648 | 7,402 | 1.6 | 69,248 | 14.7 | 25,687 | 5.5 | 76,650 | 16.3 | 392,998 | 83.7 | 51,677 | 11.0 |
| Kedah ... | 192,457 | 5,828 | 3.0 | 13,780 | 7.2 | 4,951 | 2.6 | 19,608 | 10.2 | 172,849 | 89.8 | 34,538 | 17.9 |
| Kelantan ... | 30,685 | 403 | 1.3 | 4,203 | 13.7 | 819 | 2.7 | 4,606 | 15.0 | 26,079 | 85.0 | 5,644 | 18.4 |
| Trengganu (d) ... | 4,817 | nil | nil | nil | nil | nil | nil | nil | nil | 4,817 | 100.0 | 1,893 | 39.3 |
| Perlis (e) ... | 1,367 | 36 | 2.6 | 427 | 31.3 | 109 | 8.0 | 463 | 33.9 | 904 | 66.1 | 154 | 11.3 |
| Brunei ... | 5,984 | nil | nil | 1,628 | 27.2 | 260 | 4.3 | 1,628 | 27.2 | 4,356 | 72.8 | 934 | 15.6 |
| Total U.M.S. ... | 704,958 | 13,669 | 1.9 | 89,286 | 12.7 | 31,826 | 4.5 | 102,955 | 14.6 | 602,003 | 85.4 | 94,840 | 13.5 |
| Total MALAYA ... | 1,818,441 | 29,745 | 1.7 | 218,739 | 12.0 | 52,569 | 2.9 | 248,484 | 13.7 | 1,569,957 | 86.3 | 243,109 | 13.4 |

*Notes.*—(*a*) Area out-of-tapping on estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.

(*b*) The acreage shown in column (7) is included in columns (3) and (5).

(*c*) Areas of tappable rubber rested under rotational systems are not considered as out-of-tapping and therefore columns (11) and (12) include columns (13) and (14) respectively.

(*d*) Registered companies only.

(*e*) Figures for the quarter ending 30th June, 1940.

# MALAYAN RUBBER STATISTICS Table I.

## Acreage, Stocks, Production, Imports and Exports of Rubber, including Latex, Concentrated Latex and Revertex.

### for the month of August, 1940, in Dry Tons.

| State or Territory | Stocks at beginning of month 1 | | | Production by Estates of 100 acres and over | | Production by Estates of less than 100 acres estimated 2 | | Imports during the month | | Imports January to Aug. 1940 | | Exports including re-exports during the month | | Exports including re-exports January to Aug. 1940 | | Stocks at end of month | | | Consumption 3 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ports | Dealers | Estates of 100 acres and over | during the month | Jan. to Aug. 1940 | during the month | Jan. to Aug. 1940 | Foreign | From Malay States & Labuan | Foreign | From Malay States & Labuan | Foreign | Local | Foreign | Local | Ports | Dealers | Estates of 100 acres and over | during the month | Jan. to Aug. 1940 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| Malay States :— | | | | | | | | | | | | | | | | | | | | |
| Federated Malay States ... | ... | 5,894 | 16,572 | 15,784 | 112,264 | 4,685 | 64,802 | Nil | Nil | Nil | Nil | 15,008 | 6,279 | 118,754 | 66,379 | ... | 4,649 | 16,837 | 162 | 621 |
| Johore ... | ... | 2,670 | 6,757 | 6,949 | 50,343 | 3,765 | 41,704 | Nil | Nil | Nil | 569 | 3,293 | 8,507 | 29,027 | 66,238 | ... | 1,870 | 6,471 | ... | ... |
| Kedah ... | ... | 496 | 3,582 | 3,615 | 26,808 | 1,093 | 10,734 | Nil | Nil | Nil | Nil | 2,031 | 2,989 | 15,503 | 25,076 | ... | 331 | 3,435 | ... | ... |
| Perlis ... | ... | 37 | 25 | 14 | 125 | 25 | 250 | Nil | Nil | Nil | Nil | Nil | 44 | Nil | 382 | ... | 31 | 26 | ... | ... |
| Kelantan ... | ... | 610 | 483 | 485 | 3,228 | 637 | 7,584 | Nil | Nil | Nil | Nil | 174 | 1,206 | 1,334 | 9,646 | ... | 370 | 465 | ... | ... |
| Trengganu ... | ... | 89 | 156 | 176 | 1,445 | 291 | 2,755 | Nil | Nil | Nil | Nil | Nil | 504 | 20 | 4,290 | ... | 48 | 160 | ... | ... |
| Brunei ... | ... | 16 | 67 | 68 | 494 | 136 | 778 | ... | ... | ... | ... | ... | 169 | ... | 1,234 | ... | 18 | 100 | ... | ... |
| Total Malay States | ... | 9,812 | 27,642 | 27,901 | 194,767 | 10,632 | 128,607 | Nil | Nil | Nil | 569 | 20,506 | 19,698 | 164,638 | 173,245 | ... | 7,317 | 27,494 | 162 | 621 |
| S. Settlements :— | | | | | | | | | | | | | | | | | | | | |
| Malacca ... | ... | 1,804 | 1,387 | 1,476 | 10,411 | 660 | 6,583 | Nil | | Nil | | 3,166 | | 21,560 | | ... | 1,661 | 1,323 | ... | ... |
| Province Wellesley | ... | 2,171 | 705 | 563 | 4,107 | 215 | 2,025 | Nil | | Nil | | 10,271 | | 75,437 | | ... | 1,158 | 675 | ... | ... |
| Penang ... | 2,272 | 3,682 | 14 | 22 | 173 | 75 | 840 | 2,839 | 19,456 | 20,800 | 164,805 | | Nil | | Nil | 2,739 | 4,188 | 16 | ... | ... |
| Singapore ... | 12,460 | 18,336 | 286 | 165 | 1,297 | 10 | 556 | 17,606 | | 145,755 | | 32,269 | | 240,624 | | 15,194 | 18,308 | 284 | 27 | 144 |
| Labuan ... | ... | 29 | Nil | Nil | Nil | 10 | 116 | 63 | | 463 | | Nil | | Nil | | ... | 22 | ... | ... | ... |
| Total Straits Settlements ... | 14,732 | 26,022 | 2,392 | 2,226 | 15,988 | 970 | 10,120 | 20,508 | 19,456 | 167,018 | 164,805 | 45,706 | Nil | 337,601 | Nil | 17,929 | 25,337 | 2,298 | 27 | 144 |
| Total Malaya ... | 14,732 | 35,834 | 30,034 | 29,317 | 210,695 | 11,602 | 138,727 | 20,508 | 19,456 | 167,018 | 165,374 | 66,212 | 19,698 | 502,239 | 173,245 | 17,929 | 32,654 | 29,792 | 189 | 765 |

### TABLE II
### DEALERS' STOCKS, IN DRY TONS 3

| Class of Rubber | Federated Malay States | S'pore | Penang | Province We'sly D'dings M'cca. | Johore | Kedah |
|---|---|---|---|---|---|---|
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| Dry Rubber | 3,870 | 17,004 | 3,700 | 2,479 | 1,303 | 161 |
| Wet Rubber | 779 | 1,304 | 488 | 380 | 567 | 170 |
| Total ... | 4,649 | 18,308 | 4,188 | 2,859 | 1,870 | 331 |

### TABLE III
### FOREIGN EXPORTS

| PORTS 29 | For month 30 | Jan. to Aug. 1940 31 |
|---|---|---|
| Singapore ... | 43,010 | 349,006 |
| Penang ... | 15,138 | 102,536 |
| Port Swettenham. | 7,545 | 49,384 |
| Malacca ... | 119 | 1,293 |
| Malaya ... | 66,212 | 502,239 |

### TABLE IV
### DOMESTIC EXPORTS 4

| AREA 32 | For month 33 | Jan. to Aug. 1940 34 |
|---|---|---|
| Malay States ... | 40,161 | 337,010 |
| Straits Settlements | 3,331 | 26,616 |
| Malaya ... | 43,492 | 363,635 |

*Notes:*—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.

# METEOROLOGICAL SUMMARY, MALAYA, AUGUST, 1940.

| Locality. | Air Temperature in degrees Fahrenheit | | | | | | | Earth Temperature | | Rainfall | | | | | | | | Bright Sunshine. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Means of | | | Absolute Extremes | | | | | | Total. | | Most in a day. | Number of days. | | | | | | | |
| | A. Max. | B. Min. | Mean of A and B | Highest Max. | Lowest Min. | Lowest Max. | Highest Min. | At 1 foot | At 4 feet | | | Amt. | Precipitation .01 in or more | Precipitation .04 in or more | Thunder-storm | Fog morning obs. | Gale force 8 or more | Total. | Daily Mean. | Per cent. |
| | °F | °F | °F | °F | °F | °F | °F | °F | °F | in. | mm. | in. | | | | | | hrs. | hrs. | |
| Kuala Lumpur Aerodrome Selangor ... | 89.9 | 72.6 | 81.3 | 92 | 69 | 85 | 75 | 84.1 | 85.7 | 8.22 | 208.8 | 1.98 | 20 | 12 | 5 | 3 | — | 172.85 | 5.57 | 46 |
| Port Swettenham Aerodrome, Selangor ... | 88.7 | 71.7 | 80.2 | 91 | 69 | 83 | 74 | 85.2 | 86.4 | 7.32 | 185.9 | 2.02 | 16 | 11 | 5 | — | — | 178.15 | 5.75 | 47 |
| Sitiawan, Perak ... | 89.0 | 73.0 | 81.0 | 92 | 71 | 83 | 75 | 84.0 | 85.6 | 3.77 | 95.8 | 1.42 | 12 | 7 | 1 | — | — | 197.80 | 6.38 | 52 |
| Ipoh Aerodrome, Perak ... | 89.9 | 72.6 | 81.3 | 93 | 70 | 82 | 76 | 83.8 | 85.0 | 4.13 | 104.9 | 1.60 | 13 | 12 | 1 | — | 1 | 188.25 | 6.07 | 49 |
| Temerloh, Pahang ... | 90.2 | 72.4 | 81.3 | 93 | 69 | 84 | 75 | 85.9 | 87.0 | 5.96 | 151.4 | 2.06 | 12 | 10 | 6 | 8 | 1 | 187.90 | 6.06 | 50 |
| Kuala Lipis, Pahang ... | 89.2 | 72.1 | 80.7 | 93 | 69 | 86 | 75 | 84.0 | 85.3 | 6.67 | 169.4 | 1.68 | 15 | 15 | 5 | 25 | 1 | 166.65 | 5.37 | 44 |
| Kuala Pahang, Pahang ... | 86.5 | 74.0 | 80.3 | 89 | 71 | 80 | 78 | 86.3 | 87.5 | 4.18 | 106.2 | 1.26 | 13 | 11 | 2 | — | 4 | 206.05 | 6.65 | 55 |
| Kallang Aerodrome, S'pore ... | 85.2 | 76.4 | 80.8 | 87 | 72 | 79 | 81 | 82.5 | 83.8 | 10.64 | 270.3 | 2.22 | 15 | 14 | 3 | — | — | 173.90 | 5.61 | 46 |
| Bayan Lepas Aerodrome Penang ... | 86.6 | 74.0 | 80.3 | 90 | 71 | 80 | 76 | 84.6 | 85.9 | 12.08 | 306.8 | 3.08 | 19 | 13 | 7 | — | — | 195.25 | 6.30 | 51 |
| Malacca Town, Malacca ... | 84.5 | 73.3 | 78.9 | 87 | 69 | 78 | 77 | 83.3 | 85.0 | 8.73 | 221.7 | 1.49 | 17 | 14 | 3 | — | 3 | 167.95 | 5.42 | 44 |
| Kluang, Johore ... | 86.3 | 71.2 | 78.7 | 90 | 68 | 77 | 74 | 81.0 | 82.5 | 5.20 | 132.1 | 0.93 | 18 | 14 | — | 8 | 1 | 131.75 | 4.25 | 35 |
| Mersing, Johore ... | 85.5 | 71.6 | 78.5 | 91 | 70 | 76 | 74 | 81.5 | 82.7 | 8.30 | 210.8 | 1.14 | 19 | 18 | 2 | — | 2 | 141.00 | 4.55 | 37 |
| Alor Star, Kedah ... | 87.3 | 73.1 | 80.2 | 91 | 71 | 83 | 75 | 84.6 | 86.2 | 10.08 | 256.0 | 2.22 | 21 | 17 | 1 | — | 5 | 182.20 | 5.88 | 48 |
| Kota Bahru, Kelantan ... | 90.1 | 73.1 | 81.6 | 92 | 71 | 86 | 75 | 85.8 | 86.2 | 6.45 | 163.8 | 1.90 | 13 | 12 | 4 | — | 2 | 207.50 | 6.69 | 54 |
| Kuala Trengganu, Trengganu | 88.8 | 72.5 | 80.7 | 91 | 70 | 85 | 75 | 84.5 | 86.7 | 5.06 | 128.5 | 2.49 | 12 | 10 | 4 | — | 1 | 203.85 | 6.57 | 53 |
| Labuan ... | 87.2 | 76.7 | 81.9 | 91 | 71 | 83 | 80 | 85.1 | 86.8 | 11.43 | 290.3 | 2.76 | 21 | 19 | — | — | 1 | 190.25 | 6.14 | 50 |
| HILL STATIONS. | | | | | | | | | | | | | | | | | | | | |
| Fraser's Hill, Pahang 4268 ft. | 74.5 | 62.6 | 68.5 | 78 | 60 | 71 | 65 | 72.0 | 72.7 | 5.45 | 138.4 | 1.43 | 17 | 11 | — | 10 | — | 154.95 | 5.00 | 41 |
| Cameron Highlands, Tanah Rata, Pahang 4750 ft. ... | 71.8 | 58.1 | 64.9 | 75 | 52 | 68 | 63 | 71.3 | 70.6 | 3.59 | 91.2 | 0.75 | 18 | 14 | — | — | 1 | 136.20 | 4.39 | 36 |
| Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ... | 70.9 | 59.8 | 65.3 | 75 | 58 | 65 | 62 | * | * | 3.20 | 81.3 | 0.57 | 17 | 13 | — | — | 1 | 146.70 | 4.73 | 38 |

* Not recorded.